

Defining the Forests

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Forests of the South are very diverse and productive. Included among southern forests are the boreal spruce-fir forests of the highest mountain peaks of the Blue Ridge Mountains to the lowest bottomland hardwoods on flood-deposited soil with elevations near sea level. In between are the diverse upland hardwood stands in northerly mountainous areas of the South and southern pines and hardwoods along the Coastal Plain.

Climate of the south is predominantly continental, except for the cooler Appalachian Mountains, grading to maritime along the coast (Schoeneberger 1995).

Temperatures are generally mild in winter and hot in summer (USDA Forest Service 1969). Mean maximum temperatures for January vary from the 40s (degrees F) in the mountains to the 70s in Florida. Mean minimum temperatures for January range from the 20s in the mountains to the 60s in Florida. July mean minimum temperatures vary from the mid 50s in the mountains to the 70s along the Gulf Coast and Florida. Mean maximum temperatures are about 90 for most of the region and slightly lower in the mountains. Mean length of the freeze-free period varies from as few as 150 days in the

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higher eastern mountains to 300 days along the Gulf and lower Atlantic coasts, and even longer in peninsular Florida (USDA Forest Service 1969).

The region is well watered; most of the area receives upwards of 48 inches of precipitation and all of the area receives more than 40 inches of precipitation annually (USDA Forest Service 1969). An occasional mountain peak and the coastal area near the mouth of the Mississippi River both receive more than 60 inches of rainfall annually. The driest portions of the region, receiving 40 to 45 inches of annual precipitation, is an area east of the Appalachian mountains, including part of Virginia, and a portion of central South Carolina and Georgia; and the western portion of the region in eastern Oklahoma and Texas.

Soils of the region are formed primarily by climate, parent material, inhabiting organisms, topography, and time. Southern forest soils are shaped by a warm, moist environment with the exception of the cooler high mountains and the drier western edge of the region (Schoeneberger 1995). Generally, the warm, moist climate interacting with the geologic stability and moderate geologic age produced soils with considerable pedogenic alteration.



Forests of the South are diverse and productive. Included among southern forests are the boreal spruce-fir forests of the highest peaks of the Blue Ridge Mountains to the lowest bottomland hardwoods on flood-deposited soil near sea level (*Top: Upland oak-hickory, G. Smith; Above: Bottomland hardwoods, J. Dickson*).

PHYSIOGRAPHIC REGIONS

The Coastal Plain is the largest province of the physiographic diverse region, stretching along the Atlantic and Gulf coasts from Virginia to Texas (see color section). It

is characterized by broad flats and nearly level uplands, and is about 54% forested.

The Lower Coastal Plain is almost level flatwoods dissected by rivers and swamps (Schoeneberger 1995). Elevations are less than 90 ft. above mean sea level and soil drainage usually is poor. Soil materials are mostly sand, silt, and clay derived from river and marine sediments. Dominant soils are Ultisols, except beach sediments which are Entisols. Forests cover about 90% of the area. Historically, the area was covered with mature longleaf pine forests. But as the valuable stands were cut, harvested areas usually were regenerated with faster-growing loblolly and slash pine plantations. Also, diminished fire favored hardwoods and pines other than longleaf.

The Upper Coastal Plain is characterized by broad uplands and low plateaus (Schoeneberger 1995). It is geologically older than the Lower Coastal Plain and has greater dissection, topographical relief, and soil development. Elevations range from about 90 to 600 ft. and dominant soils are Ultisols. Within the Upper Coastal Plain various subregions vary in forest cover from a low of about 25% in peninsular Florida to about 70% west of the Mississippi River, in Louisiana and Texas.

The Piedmont is the second largest physiographic area of the region. It stretches from Georgia to Virginia, and is bounded on the west by the Appalachian Highlands and sloping down to the east and south to the Coastal Plain. The Piedmont is characterized as a rolling upland plain, derived from diverse metamorphic and igneous rock, with minor relief and moderate elevation (300-700 ft) (Schoeneberger 1995). The stable, erosional nature of this area has produced soils dominated by Ultisols from acidic rocks, Alfisols from basic igneous rocks, and Inceptisols on steep slopes. About half of the area is forested. On both the Upper Coastal Plain and Piedmont, pine and pine-hardwood forests dominate. Loblolly pine is very common. It has been planted extensively and pioneers open land where it is found in association with shortleaf pine and hardwoods, such as white oaks, red oaks, sweetgum, and yellow poplar.

The Mississippi River Valley splits the South. Most of it is a nearly level river valley with low elevations, from sea level to 520 ft. It is composed of a complex of river terraces, meanders, and backwater swamps. Soils are a variable mixture of alluvial deposits from the Mississippi River and its tributaries overlying marine sediments (Schoeneberger 1995). Dominant soil orders include: Entisols in the active floodplain, Inceptisols on low alluvial terraces, Alfisols and Mollisols on mid-ele-

vation terraces, and Alfisols on the older, higher terraces of northeastern Louisiana and eastern Arkansas. Only 27% of this productive alluvial area is forested. Historically, oak-gum-cypress forests predominated, and remain in portions of the area. Within this forest complex individual tree species and forest types often occur only on specific bottomland sites which were formed by flooding and siltation, and natural plant succession.

Within this general physiographic area is the loess-covered uplands east of the Mississippi River, covered by thick wind-blown silt up to 60 ft. deep. Dominant soils are Alfisols interspersed with Ultisols (Schoeneberger 1995). About half of this steep terrain is forested. Red oaks, such as Shumard, white oak, and yellow poplar are characteristic species of this productive hardwood forest.

The Blue Ridge Mountains are the highest mountains in the South, extending from the northern extremity of Virginia running southwesterly into Georgia. Elevations range from about 1,000 to 4,000 ft. with peaks almost 7,000 ft. The slopes are steep. The subsurface is predominantly igneous and metamorphic rocks. Steep slopes are dominated by Inceptisols and lesser slopes by Inceptisols and Ultisols (Schoeneberger 1995). The high mountainous region is dominated by forest (94%).

The Ridge and Valley province is a narrow belt west of and parallel to the Blue Ridge Mountains extending from Virginia into northern Alabama. The limestone and shale valleys of around 600 ft. elevation are bounded by steep-sided ridges of sedimentary rock (Schoeneberger 1995). Limestone-underlain soils are primarily Ultisols with some Alfisols. Sideslopes and steep ridges are dominated by Inceptisols. Forests cover about 3/4 of this area.

The Appalachian Plateaus west of the Ridge and Valley and occupying much of eastern Kentucky and a substantial part of Tennessee, are a series of deeply dissected plateaus with rolling topography. Most of the plateaus are from 1,000 to 2,000 ft. elevation with some areas exceeding that. Typically, plateau substrate is sandstone, with eroded shale underlying the sideslopes. Relatively flat uplands and valley floors are dominated by Ultisols; escarpments and valley slopes are also dominated by Ultisols (Schoeneberger 1995). Forests are the primary land use (72%). All 3 of these mountainous physiographic areas are dominated by various species of white and red oaks with other hardwood associates, such as hickories and yellow poplar.

The Interior Low Plateau lies west of the



Southern forests have never been static. They are dynamic as well as diverse, continually influenced by ever-changing forces. For example, Hurricane Hugo struck coastal South Carolina in 1989, with drastic impact on the people and forest ecosystems of the area (*D. Baumann*).

Appalachian Plateaus through middle Kentucky and Tennessee, and into Alabama. It is an extensively dissected rim with moderate elevations (300-900 ft.) underlain by limestone (Schoeneberger 1995). Alfisols dominate in the plateau interior, with Ultisols and Alfisols associated with the dissected rim. Two thirds of the area is comprised of upland oak-hickory forests.

The Ouachita Uplands lies west of the Mississippi River Valley in Arkansas and eastern Oklahoma, and is composed of 2 different formations (Schoeneberger 1995). The Ouachita Mountains is similar in form to the Appalachian Plateaus. Elevations range from about 300 to 1800 ft. and topography is steep. On steep sandstone or southerly facing cherty-limestone hills or ridges the dominant soils are Ultisols. On steeper, north-facing slopes Inceptisols predominate, and valleys composed of eroded slate, shales, and sandstones are dominated by Ultisols. Oaks, such as northern red and white, are char-

acteristic species, often found with shortleaf pine on drier sites.

North of the Ouachita Mountains is the Arkansas Valley and Ridges, composed of broad river valleys and associated ridges. Elevations and soils are similar to that of the Ouachita Mountains, except that Alfisols overly shallow limestone. Slightly over half (52%) of the area is forested.

The Ozark Plateau to the north is a deeply dissected plateau of narrow ridgetops with steep sideslopes with considerable relief and moderate elevations (500-2,500 ft.). Ridges and uplands are dominated by Ultisols. Sideslopes are dominated by Inceptisols, and valley floors overlying limestone, dolomite, and shales are dominated by Alfisols (Schoeneberger 1995). Upland forests dominate the landscape (80%). The Ozark forests are similar to those of the Ouachitas except pines are scarcer and hardwoods more dominant.

The Central Lowlands to the west of the Ouachita Uplands is a geomorphic area of broad flats and rolling hills with low elevations (400-1,200 ft.). The sandstones, shales, and clays are dominated by Mollisols and interspersed with Alfisols in alluvial areas (Schoeneberger 1995). Only 8% of the area is wooded. Characteristic species of the oak-hickory forests include post and blackjack oaks.

FOREST INFLUENCES

Southern forests have never been static. They are dynamic as well as diverse; continually changing in response to ever-changing forces. The forests have been molded and influenced by a number of natural factors as well as the different populations of people who have used the forests of the South. Some factors influencing southern forests have worked slowly and have not been apparent in the short term. Other factors shaping southern forests have been obvious and dramatic. Wind storms have played a major role in shaping southern forests. The coastal areas of the South have been subjected to severe tropical storms. For example, in September 1989 Hurricane Hugo struck coastal South Carolina near Charleston with winds over 150 mi/h, with drastic impact on the people and the forest ecosystem of the area (Baumann et al. 1996). The storm killed 35 people and caused more than \$6 billion in property damage. Over 4 million acres of timberland and nearly 11 billion board feet of sawtimber were damaged or destroyed. The pine overstory of the coastal forest was virtually eliminated throughout many areas, and soon replaced by a brushy hardwood understory.

Ice storms also affect southern forests. Conifers with long persistent needles are particularly vulnerable to ice damage because precipitation accumulates and freezes. Because of its fast early growth, slash pine was planted extensively in the deep South. But it is vulnerable to breakage from ice and many plantations never reach rotation age without sustaining ice damage.

A number of diseases and insects have been a part of and helped shape southern forests. The American Chestnut was a dominant tree of the eastern mountains. The Chestnut blight was introduced, spread rapidly, and in the early 1900s the American Chestnut was eliminated from eastern forests. Roots remaining from a few trees live and resprout periodically, but the sprouts succumb to the blight as they develop. Dogwood anthracnose is a fungus that infects and can kill dogwoods. It was introduced with an Asiatic dogwood into the northeastern U. S. and has moved southerly into the southern

Appalachians. The disease particularly affects plants above 3,000 ft. elevation and the full impact of the disease is yet to be determined. A large number of other fungi infect southern hardwoods.

The main widespread diseases affecting southern pines are fusiform rust, littleleaf syndrome, and annosus root rot (Meadows and Hodges 1995). Loblolly and slash pine seedlings and saplings are particularly vulnerable to fusiform rust, and annual economic losses probably exceed \$100 million. Oaks are alternate hosts for the fungus. Littleleaf syndrome is the most serious disease affecting shortleaf pine in the South. Incidence usually is higher in trees growing on poorer sites. Annosus root rot is a major disease of southern pines, causing reduction in tree growth and direct mortality. Stumps and roots exposed by harvest operations provide avenue for invasion into the root systems.

Insects have evolved with southern forests and play a major role in these forested systems. A few examples illustrate their importance. The southern pine beetle is an important economic pest of southern pines (Meadows and Hodges 1995), affecting millions of acres during periodic outbreaks. Usually pines under stress and of low vigor are more vulnerable to attack, but at epidemic beetle population levels a wide variety of pine trees can be infected and killed. In mixed pine-hardwood stands pines killed by diseases and insects usually are followed by shade-tolerant hardwoods.

In the South, Fraser fir occurs only at high elevations in the Blue Ridge Mountains. It is being threatened by the balsam wooly adelgid, which feeds on the main tree bole and kills trees. The tiny insect was introduced into New England in the early 1900s and has spread south.

Currently, an insect that is substantially affecting southern upland hardwood forests is the gypsy moth. In the eastern mountains, the gypsy moth defoliates mostly oaks and reduces their vigor. Repeated defoliations eventually can result in mortality.

Man's Direct Influences

Virtually all of the South's forests today have been molded by man directly as well as indirectly. Usually, harvesting has been selective for certain species or forms of trees. Often those that remained were of lesser value or poorer form, or defective for use as wood products. For example, bald cypress of the bottoms and longleaf pine of the lower Coastal Plain are forest types that have diminished the most. Cypress was in demand for the heartwood's decay resistance and easy working properties. In the humid southern climate decay-resist-

ant cypress was used for boats, houses, water tanks, and numerous other products. The large trees in vast stands were girdled to dry, felled, floated to mills, and sawn into boards. Also, longleaf pine was in high demand due to the light weight, large size, cylindrical shape, and sparsity of lower limbs. Vast stands of these monarchs fell to the saw. Both cypress and longleaf stands hardly ever were regenerated back to these same species when the mature stands were cut because they are relatively slow growing. Acreage in longleaf pine illustrates; where once there were some 90 million acres of mature longleaf pine only less than 3 million remain today (Landers et al. 1995). Man also affects southern forests in other ways. Flooding and soil deposition determine bottomland site characteristics and suitability for specific tree species and timber types. Man's alteration of flooding by creation of reservoirs, channelization, and other land and water manipulations has affected site characteristics and tree composition of forest

stands. For example, the Atchafalaya Basin of Louisiana, constructed to accommodate floodwaters from the Mississippi River, has become higher and drier from siltation. Swamp forests have been replaced by cottonwood and willow stands, and soybean fields.

Also, pollutants can affect forest vigor. Ozone can occur in sufficient concentrations to injure trees. Ozone is the main air pollutant of concern in the South, where there are numerous sunny days and high levels of automobile and industry emissions of hydrocarbons and nitrogen oxides, precursors of ozone (Fox and Mickler 1995:9).

STATUS OF THE FORESTS

Forests continue to dominate the southern landscape, covering some 214 million acres (or a little over half) of the landscape. Commercial timberland accounts for 94% of the total, with the remainder in reserved and

Over half of the South is forested; pines and pine-hardwoods dominate on upland sites in the lower South.



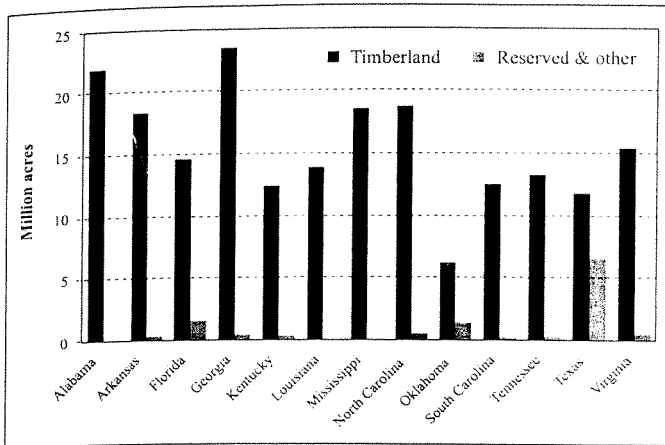


Fig 1. Area of forestland by state (from Sheffield and Dickson 1998).

other forests. The most heavily forested states, each with over 15 million acres of forest and over 60% forested, include: Georgia, Alabama, Mississippi, North Carolina, and Virginia (Fig. 1). Proportion of forest land varies widely by county (Fig. 2). The least forested areas are southern Florida, the Mississippi River Delta, the western edge of the region, and local areas where urban or agriculture land dominate. Heavily forested areas are dispersed over much of the region.

Composition

Over half (52%) of the timberland of the South is classified as hardwoods (Sheffield and Dickson 1998) (see color section). Upland hardwood forests cover 75 million acres or some 37% of the timberland and has

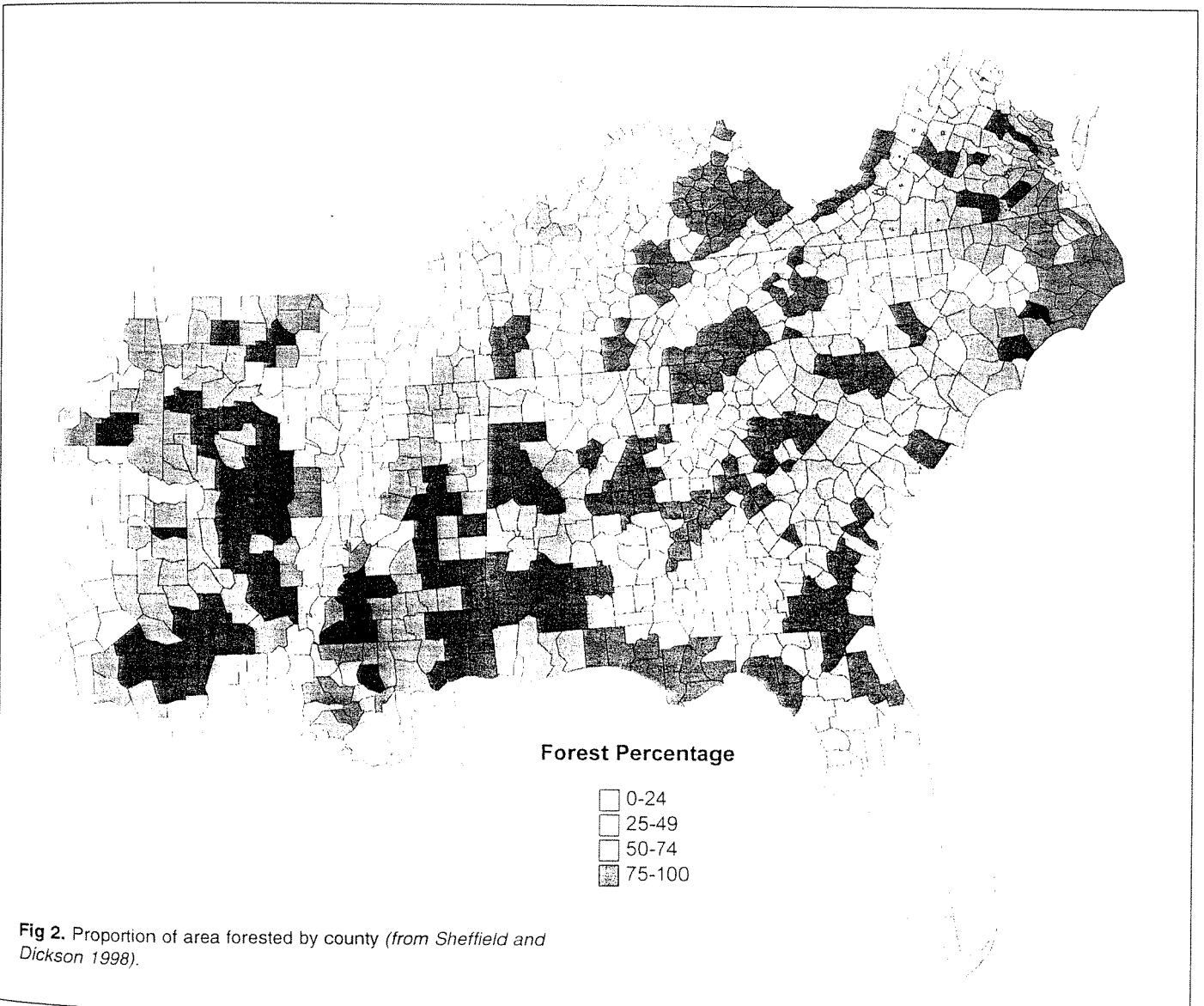


Fig 2. Proportion of area forested by county (from Sheffield and Dickson 1998).

Table 1. Percentage of timberland in southern states by forest type.

State	Pine plantation	Natural pine	Oak-pine	Upland hardwood	Bottomland hardwood
Alabama	18	18	19	33	10
Arkansas	12	17	16	38	16
Florida	33	19	9	14	25
Georgia	23	26	12	25	15
Kentucky	1	5	7	82	5
Louisiana	18	21	12	15	34
Mississippi	16	15	17	32	20
North Carolina	11	22	14	38	14
Oklahoma	10	13	14	53	10
South Carolina	21	23	15	20	20
Tennessee	3	8	12	72	5
Texas	15	21	21	27	15
Virginia	10	12	13	62	4
South	15	18	14	37	15

^aFrom Sheffield and Dickson (1998).

increased in recent years. Upland hardwoods comprise more than half of the timberland in Kentucky, Tennessee, Virginia, and Oklahoma (Table 1). The oak-hickory association occurs throughout most of the region, but predominates in mountainous areas, such as the southern Appalachians and Ouachita Uplands. Common species include oaks, hickories, yellow poplar, sweetgum, American beech, and red maple.

Bottomland hardwood forests account for about 15% of the timberland, or 30 million acres. Over half of these lowland forests are located in the alluvial floodplain of major rivers in Louisiana, Florida, Georgia, and Mississippi (USDA Forest Service 1988). Prevalent species include water, willow, laurel, swamp chestnut, and cherrybark oaks; tupelo, blackgum, sweetgum, and baldcypress.

Mixed oak-pine stands are comprised of more than half hardwoods and 25 to 50% pines. These stands occupy about 29 million acres, or 14% of southern timberland, and occur throughout the region.

Approximately a third of southern timberland is dominated by pine types; some 36 million acres (18%) in natural pines and 31 million acres (15%) in planted pines (Sheffield and Dickson 1998). Loblolly pine is the most common species in natural pine stands, which have declined in area significantly in recent decades. Natural stands of loblolly and associated hardwoods are especially prevalent in the Coastal Plain and Piedmont, where they have pioneered abandoned cropland and

pasture. Shortleaf pine, a common associate of loblolly, is dominant at higher elevations, such as the southern Appalachian Plateau and Ridge and Valley, and the Ouachita Uplands.

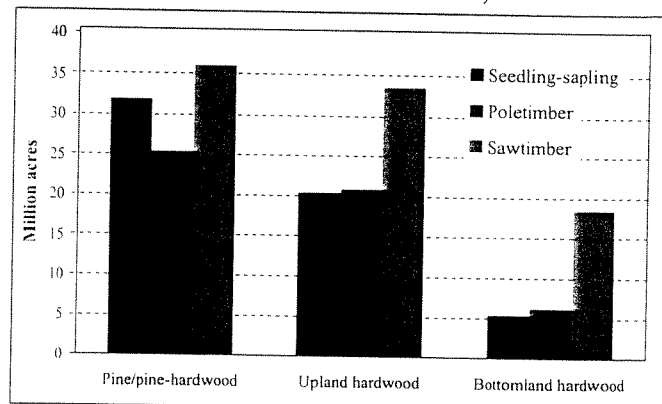
Pine plantations, which have increased significantly recently, comprise some 15% of southern commercial forests region wide. Pine plantations comprise 1/3 of Florida timberland, and make up over 1/4 of the timberland in much of the lower Coastal Plain of South Carolina, Georgia, Alabama, Mississippi, Louisiana, and eastern Texas (Table 1). Loblolly pine is the species most widely planted, with slash pine planted in some southerly areas. Recently there is some effort to reestablish longleaf pine.

Age

In the last 2 decades, overall southern forests have aged. For both softwoods and hardwoods, sapling and pole-sized trees have become less abundant and conversely, sawtimber-sized trees have increased (Sheffield and Dickson 1998). The most recent data showed sawtimber-sized trees were more abundant than sapling or poletimber-sized trees in pine/pine-hardwood stands and dominant over smaller trees in upland hardwood and bottomland hardwood stands (Fig. 3).

Ownership

Forests classified as timberland in the South largely are in private hands. About 2/3 of southern forest timberland (138 million acres) is owned by nonindustrial private forest owners. Forest industry has about 20%, or 41 million acres. About 10% (21 million acres) is in National Forests (11 million acres) and other federal, state, and municipal land. Nonindustrial forest land dominates the landscape in the northern portion of the

Fig 3. Area of general forest types in seedling-sapling, poletimber, and sawtimber (from Sheffield and Dickson 1998).



Of the 182 million acres of southern timberland, about 90% is privately owned, mostly nonindustrial owners (*J. Dickson*).

region where upland hardwoods are most common. Over 3/4 of the timberland is in this classification in Kentucky, Tennessee, Virginia, and North Carolina. Conversely, in the deep South where the more valuable pines dominate, forest industry ownership is higher. In Louisiana, eastern Texas, Florida, Georgia, Alabama, and Arkansas, forest industry controls at least 25% of the timberland (Sheffield and Dickson 1998). Over half of the National Forest timberland is located in Arkansas, Virginia, Mississippi, and North Carolina. Upland hardwoods predominate on National Forests of the Appalachian Mountains; whereas natural pine, upland hardwoods, and mixed pine-hardwoods dominate National Forests elsewhere in the South.

Economic Value

Timber is a very important economic commodity in the South. An estimated 7.5 billion cubic feet of roundwood timber products (sawlogs, veneer logs, pulpwood, fuelwood, and other round products) were harvested from southern forests in 1984 (USDA Forest Service 1988). Of this volume, over 5 billion cubic feet came from softwood species, primarily southern pine; and almost 2.5 billion cubic feet from a variety of hardwood species. The stumpage value of the trees cut in 1984 was \$2.7 billion for softwoods and \$0.4 billion for hardwoods. The value added from harvesting and transportation totaled \$6.1 billion in 1984; \$4.5 billion for softwoods and \$1.6 billion for hardwood products. The \$6.1 billion product value was about twice the value of soybeans or cotton produced, and about three times the value of tobacco, wheat, or corn crops in the South.

Forest industries in the South produced about 10% of value added to the southern economy and employed about 10% of southern workers. Timber as a crop ranked among the top three agricultural crops in value in all southern states, and was first in value in 6 states: Virginia, S. Carolina, Georgia, Alabama, Mississippi, and Louisiana.

Harvesting and associated economic value has increased recently as a result of increased wood demand and harvest restrictions in the Northwest. In 1991 the South accounted for 55% of domestic growing stock removals, up from 45% in 1970 (Powell 1992).

Wood Products

Harvested trees from southern forests go into a variety of products. Most trees large enough to be cut into lumber are harvested and used mostly as sawlogs (USDA Forest Service 1988). Smaller trees and trees of lower grade are cut as pulpwood to be made into paper and reconstituted wood products. Pulpwood and sawlogs are the 2 main wood products of southern forests. Some 2.4 billion cubic feet of softwood pulpwood and 1.5 billion cubic feet of hardwood pulpwood was harvested in 1996; 41% of the total roundwood production (Fig. 4). Sawlogs comprised 38% of roundwood harvest; 2.7 billion cubic feet of softwoods and 959 million cubic feet of hardwoods (Johnson and Stratton 1998).

Relatively large, high quality logs and bolts are selected for veneer for use in furniture, cabinets, and plywood. Veneer logs comprised about 9% of the volume of roundwood products but represented a higher



Timber is a very important economic commodity in the South. Almost 10 billion cubic feet of roundwood timber products were harvested from southern forests in 1996. Timber as an agricultural crop was first in value in about half (6) of the southern states, and was among the top 3 in all states.

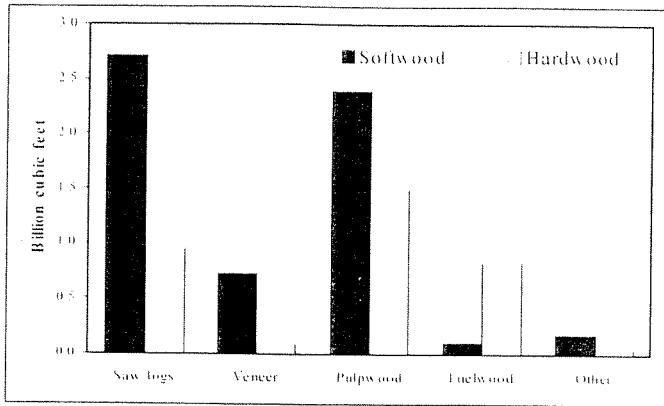


Fig 4. Volume of roundwood output in the South by product and species group, 1996 (from Johnson and Stratton 1988).

proportional stumpage value. There was about 8 times the volume of softwoods as hardwoods.

Southern forests also produce substantial fuelwood (Fig. 4); about 10% of the roundwood production went for fuelwood for industrial and residential use (Johnson and Stratton 1998). Hardwoods primarily were used;

24% of the hardwood harvest (839 million cubic feet) went for fuelwood, but only about 2% of the softwoods (109 million cubic feet).

A variety of other wood products produced from southern forests account collectively for about 2.5% of roundwood production and are not commercially important regionally, but individual products may be locally significant. These products include poles and pilings (softwood), fenceposts, cooperage logs and bolts, mine timbers, shingle bolts, handle bolts, wood turnings, panel products, other items, and chemical wood (USDA Forest Service 1988).

SILVICULTURE

Both even-aged and uneven-aged silvicultural systems are employed to harvest and regenerate southern forests. Even-aged stands are often maintained when intolerant to mid-tolerant species of trees are favored. Even-aged stands may be regenerated by clearcutting, in which all stems are removed; seed tree cut, in which

Both uneven-aged and even-aged silviculture systems, such as this shelterwood, are employed to regenerate southern forests (R. Mirarchi).



some mature trees (typically 8-12 per acre) are left during harvesting to seed and regenerate the stand; and shelterwood cut, in which the overstory trees are removed in a series (usually 2 or 3) of partial cuts with the harvesting effects on the residual stand moderated over time (Smith 1962). Seed tree and shelterwood systems use natural regeneration. Natural regeneration often is adequate in small clearcuts of several acres, but planting is necessary in larger clearcuts where advance regeneration of desired intolerant species is not present. Uneven-aged stands of at least 3 tree age classes can be maintained by single-tree and group selection harvesting. Intolerant southern pines are usually maintained in even-aged stands because without full light they normally are replaced by more tolerant hardwoods. Hardwoods can be maintained in even-aged or uneven-aged stands. Both upland hardwoods and bottomland hardwoods are regenerated satisfactorily with group selection or small clearcuts that are large enough (at least 2 or 3 acres) to allow full sunlight into the harvested area and where advance regeneration is present.

Site preparation is conducted in some situations to expose the seed bed, eliminate logging residue, or reduce competing vegetation. Site preparation usually is not necessary for hardwood stands with advance regeneration, but sometimes is used in regenerating pine stands. Desired results can be achieved through burning, mechanical means, or herbicides.

Thinning is an intermediate treatment in stands of longer rotations to harvest a portion of the stand, and redistribute growth on the remaining trees. Thinning normally is applied in 10 to 15 year-old and older pine stands grown on a sawtimber rotation. Pine stands often are burned when they are thinned.

Rotations, or the age of stands at harvest, are variable, depending on products or objectives. Some forests are maintained as old growth or wilderness and are not harvested. Most forests are managed for sawtimber and/or pulpwood production. It is desirable for trees grown for sawtimber to be large and free from lower lateral limbs. A typical sawtimber rotation would be 60 to 100 years for southern pines and faster-growing bottomland hardwoods on well-drained sites and somewhat longer for upland hardwoods. Pulpwood rotations typically are 20 to 30 years for fast growing pines, and somewhat longer for slower growing hardwoods.

CONCLUSIONS

Forests of the South are diverse and dynamic. Southern forests have been and continue to be shaped by a myriad of different forces. The suitability of these forests for wildlife communities and species and options for managing the forests for wildlife are detailed in the following chapters.